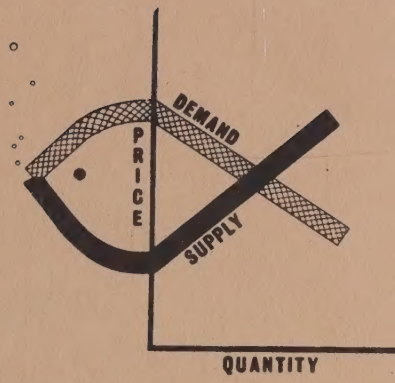

A PRICE INCENTIVE PLAN FOR DISTRESSED FISHERIES

By

A. A. Sokoloski and E. W. Carlson

Fifth Revision: April 1, 1969

Working Paper Series No. 14

BUREAU OF COMMERCIAL FISHERIES
DIVISION OF ECONOMIC RESEARCH

WORKING PAPER SERIES

1. An Application of an Investment Model to Channel Catfish Farming by R. Thompson and F. Mange.

2. The Development of Catfish as a Farm Crop and an Estimation of Its Economic Adaptability to Radiation Processing by D. Nash and M. Miller.

3. Design Study: An Optimum Fishing Vessel for Georges Bank Groundfish Fishery by A. Sokoloski (Project Monitor).

4. The Relation between Vessel Subsidy Percentages and the Rate of Return on Investment for Various Technologies and Scale Levels: The Haddock Fishery by D. Nash, A. Sokoloski and F. Bell (Project Monitors).

5. An Economic Justification for Recommended Legislative Changes in the 1964 Fishing Fleet Improvement Act by F. Bell, E. Carlson, D. Nash and A. Sokoloski.

6. The Economic Impact of Current Fisheries Management Policy on the Commercial Fishing Industry of the Upper Great Lakes by D. Cleary.

7. Cost and Earnings in the Boston Large Trawler Fleet by B. Noetzel and V. Norton.

8. Some Elements of An Evaluation of the Effects of Legal Factors on the Utilization of Fishery Resources by A. Sokoloski.

9. A Report on the Economics of Polish Factory Trawlers and Freezer Trawlers, by B. Noetzel.

10. An Inventory of Demand Equations for Fishery Products by D. Nash and F. Bell.

11. Industry Analysis of West Coast Flounder and Sole Products and an Estimation of Its Economic Adaptability to Radiation Processing by D. Nash and M. Miller.

12. Bio-Economic Model of a Fishery (Primarily Demersal) by E. Carlson.

13. The Factors behind the Different Growth Rates of U. S. Fisheries by F. Bell.

(continued on inside back cover)

A PRICE INCENTIVE PLAN FOR DISTRESSED FISHERIES

by

A. A. Sokoloski and E. W. Carlson
Division of Economic Research
Bureau of Commercial Fisheries

ABSTRACT

Key Words: Declining fisheries; Disaster; Underutilized species; Price incentive; General plan; Pilot program.

Many regional fisheries have reached crossroads and decisions must be made. Vast untapped resources exist as a potential foundation for a revitalized fishery. In addition, there exists available unemployed labor and capital in harvesting, processing, and marketing. As many of the traditional fisheries must continue at a low level due to an array of circumstances, we propose to encourage the transfer of effort to underutilized resources by means of price incentives. This will complement existing programs concerned primarily with the acquisition of basic technical and biological data or long run improvements in harvesting efficiency as provided in part by the Fishing Fleet Improvement Act.

This price incentive program is designed for three years, at which time all those underutilized species having developed successful markets may be left to operate independently. To begin this program an incentive price will be offered by the Government which will guarantee each vessel some fixed increment above the historical average market price, with certain quality stipulations. Initially this increment will be sufficiently high to stimulate a rapid conversion to the underutilized stocks. Monthly price revision will be geared to harvesting response.

To supplement this program short term high impact marketing programs will be initiated to introduce unfamiliar species. The success of this program will be keyed to a revision of the list of those species receiving an incentive. In addition, other elements of this proposal call for assistance in gear conversion and the development of processing capacity, both to take place primarily in the first year of the program.

A pilot program for the New England groundfish industry is included. In this region an abundant year class for haddock has not been generated since 1963; flounders and scallops are also declining. These resources can therefore only sustain a minimal industry. The decline of the industry will continue to even lower levels in the next two to three years unless <u>immediate</u> steps are taken.

For this pilot program, the three year program costs are $9.9 million for the price incentive, $1.7 million for the Bureau of Commercial Fisheries work in marketing, transportation and gear development, $1.85 million in gear and processing loans and $.4 million administration for a total of $13.9 million. Accumulated benefits for the first year of this program include $40,000,000 revenue and 4200 employment at the retail level due to the net increase in landings for the stimulated species.

As the problem is rapidly reaching crisis proportions this program is highly recommended for immediate implementation. This program will develop techniques applicable to all regions of the United States exhibiting similar problems. It will also develop a format for the use of supplementary funds available from the Economic Development Administration and the Small Business Administration.

A PRICE INCENTIVE PLAN FOR DISTRESSED FISHERIES

By

A. A. Sokoloski and E. W. Carlson
Division of Economic Research

"If . . . fisheries are to yield their full quota of food, now and in future years, the burden of overexploitation must be lifted from the few species that now make up more than four-fifths of the catch; the slack of wasted pounds must be taken up from the fishes that now are underutilized." 1/

"Expanded use of the underused species offers the greatest possibilities for increased domestic fish landings . . ." 2/

1/ Carson, Rachel L. "Food from the Sea," Conservation Bull. No. 33, U. S. Fish and Wildlife Service. Government Printing Office, Washington, D. C. p. 2, 1941.

2/ Johnson, Donald R. "Bureau of Commercial Fisheries Report." Fish Business, January 27, 1969, p.3

As part of a long tradition there are a great many communities in the U. S., often whole regions, that rely almost exclusively on commercial fishing for a livelihood. There has been a tendency for these local-regional fisheries to concentrate on a limited number of well-known species. For many years these species have served man well, with only occasional exceptions. There has always been a tendency for these single fishery economies to be vulnerable to a host of calamities. Among these are irregular recruitment, over-fishing by the U. S. or other nations, climatic or environmental changes, and other factors, such as the unacceptability of parasites in redfish (Sebastes Marinus, L.).

Recently assorted problems have been manifested through declining landings in such diverse regional fisheries as North Atlantic groundfish, Atlantic and Gulf menhaden and blue crab, Pacific mackerel, sardine and anchovy, Alaskan king crab, Great Lakes species and others. A combination of causes, some known and some unknown, have resulted in chronic, protracted regional economic distress. In some of these instances Bureau of Commercial Fisheries experts in the closely related fields of biology and exploratory fishing have reported that the size of the latest year classes of the traditional fisheries offer no hope for the future. This malaise extends throughout all

elements of these depressed regional fisheries, fishermen, boatbuilders, equipment suppliers, processors, wholesalers and to all those involved in market distribution at the retail level. Indeed, eventually the local banker, grocer and department store owner will feel the affect of these declining segments of the U. S. fishery.

In addition, the insufficiency of supplies compared to demands leads to prices high enough to encourage rising imports. The continuing development of this import market makes the revitalization of these existing fisheries even more difficult. With declining resource stocks, increasing imports, rising costs and higher risks due to all of these elements, the likelihood of the local initiation of bold new recuperative measures becomes unlikely. In the face of these circumstances the system is in need of an action having the affect of an electrical shock, immediate and all-pervasive, which would override the problem of risk associated with insufficient natural labor and capital resources in the "established" fisheries.

We have all heard the phrase "necessity is the mother of invention." The two introductory quotations indicate the opportunity for invention. This paper contains a general plan and a pilot program designed to assist in the alleviation of the economic distress resulting from a variety of possible causes. This is a necessity.

It should be made clear that the immediate problems faced by these fisheries in the near future will benefit little from long term plans to rehabilitate certain elements of commercial fishing activity. In particular, we may refer to the Fishing Fleet Improvement Act which is in the process of assisting in the rebuilding of the capital elements of the harvesting sector. The benefits of this plan are many. This act is specially designed for long term improvement in efficiency, whereas the problem at hand is one of the near-term low levels of abundance in several species. With the exception of the select few who have already benefited from this program and who will benefit in the very near future, this subsidy program cannot provide the immediate assistance that is necessary to avoid a complete disaster in these fisheries.

The Dilemma

Waters accessible to U. S. fishermen contain a host of species that are edible. Why then haven't the fishermen begun to switch to other species? The answer lies in a dilemma; the resources are not available to bring other species to the market in large quantities, to sell for low prices while markets develop. At the same time, markets cannot develop if a regular supply of fish is not assured.

Eventually the adjustment would take place as it has in the past, as when Atlantic halibut and salmon were replaced by other species. Such a transition takes time and much hardship will ensue in the process. The following proposal is a method to help expedite the process by having the Government share the risks of harvesting new resources and developing new markets. The approach developed herein will be applicable to all regions of the U. S. where equivalent resource problems may arise.

The Proposal - The General Concept

Stated concisely, the proposal being made advocates:

(1) That the U. S. Government will guarantee landings prices for a limited time to fishermen sufficient to stimulate the harvesting of the edible underutilized species.

(2) That these species be marketed as always through the traditional auction markets, obtaining whatever price is necessary to clear these markets.

(3) That the BCF, in cooperation with active State and local agencies and industry, develop a marketing program for these species to stimulate consumption.

(4) That the BCF initiate limited loan programs to facilitate conversion to the new gear and the construction of the new processing plants needed to develop new fisheries with a minimum of delay.

The ultimate goal would be to develop consumption patterns which may at some time in the future continue despite a gradual phaseout of Government participation after three years.

The immediate goal of this price incentive and marketing program is to divert excess effort from the traditional fisheries. There would, of course, be many possible ways of proceeding to attain this goal. However, it is our belief that the multiple benefits from a price incentive program make this approach the most desirable.

Consider first the present problems of the fisherman. Historically markets have been dominated by a traditional species. Presently, these species are not available in sufficient numbers to support the past level of harvesting activity, to say nothing about any possible future expansion.

The logical alternative is for fishermen to transfer their invested capital and fishing capacity to other resources in the immediate geographic areas. However, and perhaps largely in part because of the dominance of the traditional species, virtually all other species which have been landed or could be landed at one time or another during the past several years are looked upon as inferior products and have been priced accordingly. Thus, only

token quantities of many of these species have been landed historically.

The proposal is to establish a series of price incentives for underutilized species. The additional incentive of these prices will be such that effort will be transferred from the historical resources to these "new species." These incentives will be a function of estimates of prices needed to generate adequate wages and profits, and the magnitude of the unused resource.

All information currently available on the operating costs and the level of gross revenues needed to yield a reasonable return on investment will be used to determine those price levels which will be necessary to stimulate harvesting activity for these underutilized species.

Although this activity would provide considerable assistance to the harvesting element of the fishing industry, it would not represent a fundamental change for the better without some assistance in the marketing of these species. As part of this proposal, once price incentives have been instituted, there would be a gap in initial stages between the incentive price level and the market price as it has existed historically.

The historical market price represents two basic elements. The first of these is the consumer's desire to utilize the species.

Very little can be said at this time about consumer motivation for the consumption of most of these species. One item about which we can be certain is that on the whole the consuming public has not had a substantial exposure to these products. A considerable amount of ignorance exists therefore on the part of the consumer as to the actual qualities of the products which would be generated under this proposal. The first element of a marketing program therefore would be to disseminate information concerning the nature of these products, the optimum product forms, and their potential utilization in a regular consumption pattern.

A second problem concerning the marketing of these resources relates to volume. For those products that have appeared on the market, there exists considerable reluctance on the part of retailers and wholesalers to participate in marketing activity because of the unreliable volume of the product which may be available at any point in time. Because of this there has been considerable reluctance to develop a market for a product with an irregular supply pattern. With the plan described here, considerable volumes of these under-utilized species will be generated. This means that at a minimum the second of the two marketing problems, i.e., the uncertainity of the product supply, will be to a large extent solved.

What remains, therefore, is to begin an educational process. The starting point will be guaranteed volumes of fish of several varieties which will be available at a certain initial point in time. The next step will be for the industry (fishing, processing, wholesaling, and retailing) to determine the handling and marketing procedures that will be economical and that will maintain good quality. These procedures must then be explained to those elements of the industry who will be responsible for the movement of these products. Finally, the industry should develop and carry out a coordinated program of promotion and advertising. With the completion of this activity we would then have the rudiments of a complete plan, beginning with the stimulation of new harvesting activities for underutilized species via the means of price incentives through to the consumer and the consumption of these underutilized species by means of the initiation of the revised marketing program.

If successful this will accomplish two things. The first will be to provide consumers with a new supply of lower cost fish and the second would be to assist in the rapid development of new markets for their products, thereby increasing employment and income for these fishermen as well as processors, wholesalers, and retailers.

The Proposal -- The First Procedural Steps

Although the first step in this plan is the harvesting process, in actuality the initial investigation to determine which species merit price incentives involves deriving answers to some marketing questions. We must determine, first of all, which of the many underutilized species actually do have some marketing potential by answering questions relating to market potential. The list of species will then be reduced.

Before proceeding, however, three points should be emphasized. First, this plan is not being presented as one of continuing duration. With some degree of success, it is necessary to generate only some short term plan which will be superseded in two or three years by more basic and fundamental Bureau programs. Secondly, by virtue of the general nature of this plan, once the mechanics of its operation have been perfected it is a plan which presently or at any time in the future, could be utilized in any fishery in any geographic area for the general purpose of alleviating common short run resource problems. Finally, this plan, as discussed herein, should be considered as only a general proposal rather than a detailed operational plan. Therefore, the following pages will contain little in the way of specific operational mechanics.

Once certain species have been designated as having additional market potential, a further question must be answered. Can these species be harvested by the existing capital in the industry with a minimum amount of investment required to convert existing vessels and gear? Those species meeting this requirement, along with accompanying considerations relating to vessel and gear utilization, will be included in the final selection of species in the price support program.

The final step is the specification of the price incentives to be used in the initiation of this program. The determination of each of these individual prices involves the combined use of information relating to the cost of harvesting each of the species and some measure of the quantities which will be sold on the market at certain price levels. It should be noted immediately, however, that this latter reference to market clearing is not of significance when we are considering artificial price supports. The prime cost to the U. S. Government relating to this program will be determined by the difference between incentive price and the market clearing price weighted by the volume of each species which is actually harvested. Only at some later period when the Government program may be terminated will it be necessary to determine the degree to

which the natural market price may be sufficient to continue as an incentive to harvest each of these now underutilized species.

Therefore, incentive market price is determined by taking into account the harvesting cost plus a fair return on investment including any additional risk factors associated with the initiation of harvesting these new species. In the operation of this price incentive mechanism, some provision must be made for the adjustment of the price incentive, if it should stimulate either an excessive or an insufficient response. Ample notice would be provided to all concerned in advance of the change.

The actual mechanism will ensure that the usual market incentives for high quality products still prevail. This will be done by the following procedure. Each fisherman will be guaranteed the difference between a fixed incentive price and the monthly average landings price for each species. In this manner, any fisherman who lands fish of a higher than average quality, and therefore valued at higher than the average market price, will receive a higher price than the monthly incentive. Table 1 demonstrates how this works.

Table 1. An Example of the Operation of the Price Incentive Mechanism

	(1) Average market price	(2) Guaranteed price	(3) Incentive increment	(4) Individual landings price	(5) Total price to fisherman (3) + (4)
Fisherman					
A: Average quality	4	6	2	4	6
B: Below average quality	4	6	2	2	4
C: Above average quality	4	6	2	6	8

Fisherman A, with average quality fish, receives $.06 per pound, the guaranteed price. Fisherman B, with below average quality fish receives $.04 per pound, or $.02 at the market plus the incentive increment of $.02 which is the difference between the fixed price and the average monthly landings price. Fisherman C receives $.08 per pound, or $.06 for his above average quality fish plus the $.02 increment.

A further specification of this incentive mechanism would include such items as lower limits on the size and quality of certain species, and on seasonal patterns in landings, prices, and quantities.

Additional costs will be incurred through the marketing activities associated with this program. A brief discussion of these costs and possible source of funds for this activity, as well as the pricing activity, follows.

Because considerable marketing activity is now being generated by both Federal and State agencies, the total program cost relating to marketing for this proposal is a function of the degree to which existing marketing programs may be diverted to these underutilized species without additional cost to either the Federal or State agencies. For the purpose of generating some estimate of actual program cost, possible diversions of existing funds may be considered in generating cost estimates.

A special loan program for gear conversion is also included. A survey of the industry indicates that although considerable vessel capacity is available many boats would need new gear. In particular this might include universal trawls, shrimp trawls and shrimp cooking and freezing equipment, or dredging gear. Most of this activity would occur in the first year, and as a loan program the ultimate cost should be zero.

To complete the process of moving the product from fishermen to the consumer some aid to processors is necessary. This is primarily for the handling of products new to a region, where little expertise and facilities are available. Because of inadequate plant

facilities the product generated is often initially of inferior quality and it is priced accordingly. This has inhibited development. This element would be funded at 75-85 percent in the first year and terminated by the third year.

As this program involves fisheries development, marketing, exploratory fishing and gear advancements and processing portions by Federal and State agency budgets are devoted to these areas. Within this base some programs may exist as an input into this proposal. This is especially true for those State programs involved in marketing and fisheries development, where all that is needed is a slight change in species emphasized to coordinate with this plan. Total funds from State and Federal programs including full appropriation of the amounts authorized under P. L. 88-309, 4(b), 4(c) could amount to as much as 25 percent of the total program costs. Included in the new authorizations are costs related to the following minor activities:

1. General administrative costs.
2. Costs associated with an increased transportation program.
3. Costs associated with the review of and research on the demand and supply reactions to the incentive prices, and subsequent adjustments, and the determination of optimal marketing and transportation programs.

This program is tentatively considered as a three-year plan. The three-year costs could vary considerably, however, depending on two alternative courses of action. One of these would be the inclusion of a greater number of species in the program either within the geographic area involved or an expanded geographic area. A second possibility would be the hoped for growth of the market for these species, and therefore a narrowing of the gap between the price incentive level and the marketing price level. One rate of growth has been assumed in this proposal. Other rates may occur.

Other Sources of Assistance

In addition to funds available in P. L. 88-309-4(c) for the economic development of commercial fisheries, projects have been funded for similar activities by the Economic Development Administration and the Small Business Administration. As an example we suggest that an EDA project in the range of $2,000,000, involving all New England States, would merit serious consideration.

This proposal would concentrate on marketing development, gear conversion and processing plants and should have a favorable reception for several reasons, among which are:

(1) Support by the fishing industry in the region.

(2) Support by State agencies, especially if this support is united.

(3) Support by Washington and Regional Offices of the BCF, who would offer technical assistance.

(4) Support by duly elected representatives to State and Federal Government.

In addition, the SBA has traditionally assisted both new and old businesses, and this would be a supplementary source of funds for existing and prospective processors.

Summary and Conclusion

It would be appropriate in concluding this presentation to refer briefly to the experiences elsewhere with price support programs. We have in mind, in particular, price support programs in American agriculture and price support programs in Canadian fisheries. In both of these cases, we may be able to derive multiple benefits from prior experience. First of all, certainly much can be learned about the basic mechanics of such a program. These need not be discussed further here except to indicate that the time lag in initiating such a program may be shortened considerably by availing ourselves of this entire experience. Secondly, as is inevitably

the case in such programs, there are many things which may be done wrong. Certainly there are faults, or at least have been faults in the past, in both the U. S. agricultural price support programs and in the Canadian fisheries programs.

In certain portions of U. S. agricultural price support programs of the past, and in current Canadian fisheries price support programs, the choice has been to support those commodities that are presently, or have been in excess supply. The result of these programs has been the continuing generation of a large and growing supply of the depressed product, as was the case in some sectors of U. S. agriculture, or the continuing maintenance of a high and perhaps excessive level of harvesting effort as is the case in some of the Canadian eastern provincial and Great Lakes fisheries. Examining the problems of these programs has led us to conclude that primary benefits can be derived by instituting price support programs which will attract excess production capacity away from commodities experiencing excessive harvesting pressure. In this plan, the primary goal has been to divert harvesting capacity away from depleted regional fisheries.

The benefits from this program will be felt almost immediately and this is one of its prime attributes. With appropriate support,

this program could be initiated in fiscal year 1970 and the effects should be felt within the fall and winter months of 1969. The program would be in full swing by 1970 and at that time its complete effects could be measured and adjustments could be incorporated into the 1971 fiscal year.

By way of contrast, no existing programs could generate such a comprehensive alteration in the nature of the regional fishing industries in such a short period of time. Nevertheless, such programs as the Fishing Fleet Improvement Act and Vessel Loan Program would compliment this plan over its duration. In fact it might be desirable to actually modify these longer range plans to assist in any of the necessary vessel and gear conversions associated with increasing the effort on these underutilized species. It is worthwhile to note that at the recent Saltonstall-Kennedy Advisory Committee Meetings in New Orleans the need for immediate short-term action was emphasized by several of those present during a discussion of the more long run Fishing Fleet Improvement Act.

And finally, as indicated earlier, the development and refinement of such a program would result in the creation of a potent weapon in the management of all U. S. fisheries. Once this plan has been

successfully refined it will remain as a valuable tool which may be used whenever we have the combined circumstance of an over-fished traditional fishery in need of assistance and also the presence of underutilized species in the same geographic area which may be marketed through existing marketing channels (with some assistance) and which may be harvested with modest alterations in available vessel-gear combinations. The urgency of the present situation in combination with these varied long term benefits dictate immediate consideration of such a plan.

A PILOT PROGRAM FOR NEW ENGLAND

"Georges Bank haddock recruitment continues to fail. -- Joint cruises of the Albatross IV and the Soviet research vessel Blesk, just completed, provide information on the survival of the 1968 spawning of Georges Bank haddock. The abundance index of the young of the year was again almost zero. We have now had five very poor year classes, consecutively, a very unusual situation, and one that bodes ill for the Georges Bank haddock fishery for the next two years at least." 1/

"The greatest potential for increase at the moment appears to lie in those species best taken with mid-water gear. Improved harvest technology, especially the development of versatile mid-water trawls, would greatly increase the capability of the American fisherman both to compete with the presently exploited resources (e.g. sea herring and silver hake) as well as to exploit species presently not heavily exploited (e.g. pollock and butterfish)." 2/

1/ Weekly Report, Director, BCF, December 5, 1968.
2/ Edwards, Robert L., "Fishery Resources of the North Atlantic Area," presented at the Conference on the Future of the U. S. Fishing Industry, University of Washington, Seattle, Washington, March 24-27, 1968, p. 22.

The fisheries of New England are in a state of decline that has been brought about by: (a) overreliance upon the few species that are presently exploited to their maximum and (b) adverse biological conditions. Landings and fishermen's incomes are falling as good catches become harder to make. Consequently, boats are being tied up as owners are unable to cover trip expenses and fishermen are unwilling to sail for the declining renumeration offered. The basic outlines of the problems in each port are outlined in the following section.

Evidence of the Problem

Port of Boston

The mainstay of the Boston trawler fleet is haddock. The importance of haddock is based primarily on three factors:

(1) It is a good fish to eat

(2) It has established markets

(3) It was very abundant on nearby fishing grounds

Factors 1 and 2 have not changed but for five successive years haddock have not been "born" in significant numbers; as indicated by the Director's Weekly Report of December 5, 1968.

Presently, because of insufficient data and research experience one can only hypothesize as to which of the many environmental factors may have caused this unusually protracted absence of a "normal" year class.

As this is a species where the bulk of the catch is usually three and four year old fish, it will be at least 1971 before there is any possibility that a reversal in the current decline of haddock landings can be expected. Table 2 shows the Woods Hole Biological Laboratory's estimates of the haddock abundance on Georges Bank obtained by using scientific sampling techniques. While there are deviations the trend is clear; the population weight increased markedly as the 1963 year class (the largest in history) grew, but as time has gone on, with no subsequent significant year classes, both natural mortality and fishing mortality by U. S. and other nations have reduced it to its present state.

Lest it be said that the present state of the fishing be due to "overfishing", based upon natural mortality estimates only 16 percent of the 1963 year class would be present now if no fishing had taken place. As no subsequent year class is available to sustain a commercial fishery , this constitutes a natural disaster.

The determinants of profit levels for the near term take on the following dimensions:

(1) As demonstrated by table 2 the last commercial sized year class (1963) has completed most of its life cycle, with natural and fishing mortality having taken its toll. Should

Table 2. Haddock abundance indices (catch per 30-minute haul in lb.) for Georges Bank (strata 13-25) based on Albatross IV groundfish surveys.

Albatross IV Cruise	Midpoint of Cruise day/mo/yr	Stratified Mean Catch (lb.) per haul
63-5	2/8/63	58
63-7	30/11/63	111
64-1	31/1/64	68
64-10	6/8/64	253
64-13	12/11/64	164
65-2	6/4/65	202
65-10	25/7/65	334
65-14	24/10/65	127
66-1	5/2/66	76
66-14	28/10/66	47
67-21	26/11/67	44
68-17	3/11/68	18

the 1969 year class be of commercial magnitude it will be available to the fishery in 1971. Until this time stocks available to support a commercial fishery must remain at or below the levels for 1968 as indicated in table 2.

(2) With these declining stocks available the downward trends in trips, landings and revenues, as shown in table 3, must continue. Especially relevant is the historical fact that prices have never risen sufficiently to counterbalance declining landings.

(3) Input costs in the fishing sector, as in other sectors of the economy, will most likely continue to rise, perhaps even at a faster pace, due primarily to obsolescence.

Based on the combined effect of these declining revenues and rising costs, decreased profit margins seem inevitable, with this leading to a continued reduction in the size of the fleet and related land based activity.

Other New England Ports

It should be emphasized in considering this discussion that economic problems in New England are not confined to those vessels utilizing only Georges Bank. Indeed, virtually all vessels

Table 3. Harvesting Activity and Related Revenue of Trawlers Landing at the Boston Fish Pier, 1963-1968. 1/

	1963	1964	1965	1966	1967	1968
Gross Revenue (000)	10,564	10,038	11,154	10,486	9,327	7,797
Pounds Landed, total (millions)	105	106	101	89	77	60
Haddock	74	75	75	65	50	35
Average Price						
Large Haddock	11.49¢	11.11¢	13.74¢	15.49¢	15.03¢	16.08¢
Scrod Haddock	10.45¢	9.67¢	10.49¢	11.40¢	12.61¢	15.10¢
Trips						
Large Trawlers	679	655	683	604	524	426
Medium Trawlers	877	883	799	744	898	687
Total	1,556	1,538	1,482	1,348	1,422	1,113
Catch/trip (lbs.)						
Large	88,352	92,252	90,896	84,651	72,109	70,136
Medium	50,642	50,285	48,209	48,413	32,424	42,371

1/ Not including Atlantic Avenue Landings.

depending to a large extent on the haddock resources of Georges Bank, Brown's Bank, or the area of Nantucket Shoals have been suffering from declining resources and the associated problems of rising costs as compared to declining revenues from these resources. In addition, in certain areas, many of the other important species have followed assorted declining paths. Not only does this accentuate the declining revenues from haddock, but it means these fisheries can not absorb the excess capacity resulting from the declining haddock resource.

The problems of the New England fisheries in ports other than Boston are reflected in landing evidence and related data of tables 4-7. In general one might observe that activity has been declining in these ports.

Gloucester: Landings of whiting, ocean perch and haddock have all declined. Total trips have increased slightly but pounds per trip have decreased almost 50 percent. Total revenue has also declined 30 percent in the last two years. Whiting and ocean perch do have some potential for expansion, as compared to haddock.

New Bedford: Landings of the major species; scallops, yellowtail, blackback, and haddock, all declined from 20 to 30 percent.

Table 4. Harvesting Activity and Related Revenue of Trawlers Landing at The Gloucester Fish Pier, 1963-1968.

	1963	1964	1965	1966	1967	1968
Gross Revenue (000)	6,497	5,903	6,898	7,512	5,182	5,475
Pounds Landed, total (millions)	127	114	105	107	75	75
Whiting	49	42	37	45	28	35
Ocean Perch	43	29	22	15	9	2
Haddock	17	23	24	27	19	15
Prices						
Whiting	2.24¢	2.25¢	2.86¢	4.48¢	3.04¢	3.50¢
Ocean Perch	4.96¢	4.25¢	4.25¢	4.61¢	4.30¢	3.90¢
Haddock	10.62¢	9.37¢	11.66¢	12.27¢	12.76¢	15.09¢
Trips						
Ocean Perch	481	274	214	123	57	13
Whiting	1,876	1,412	1,071	1,301	1,549	1,970
Other	3,120	4,151	4,478	4,124	4,775	4,323
Pounds/trip	23,021	19,307	18,201	19,189	11,752	11,827

le 5. Harvesting Activity and Related Revenue of Trawlers Landing at Bedford, 1963-1968.

	1963	1964	1965	1966	1967	1968
llops						
llop revenue (000)	7,395	7,022	7,660	5,291	5,262	8,582
llop pounds (millions)	15.9	12.8	11.4	10.7	6.8	7.7
llop prices	49.4¢	54.8¢	67.4¢	49.3¢	77.3¢	111.9¢
trips	1,108	1,045	880	819	675	844
llop catch/trip (pounds)	1,445	1,227	1,291	1,310	1,007	912
ndfish						
l revenue (000)	9,243	9,551	11,931	13,334	9,716	9,903
ds landed, total (millions)	100.6	104.4	103.5	100.2	79.4	82.8
ellowtail	63.8	65.7	66.0	53.3	42.5	53.9
lackback	9.3	10.6	14.0	18.5	12.6	7.8
addock	10.2	12.1	11.8	15.7	10.9	7.2
es						
ellowtail	6.6¢	7.1¢	9.8¢	12.9¢	10.8¢	10.4¢
lackback	14.4¢	11.9¢	12.4¢	13.9¢	13.8¢	13.9¢
addock, large	10.0¢	9.8¢	12.8¢	13.3¢	14.2¢	14.2¢
" scrod	9.2¢	8.6¢	9.5¢	10.0¢	10.7¢	12.3¢
trips, O.T.	3,020	2,792	2,867	3,429	3,024	2,587
h/trip (pounds)	31,856	33,282	32,547	28,049	25,238	30,328

Table 6. Harvesting Activity and Related Revenue of Trawlers Landing at Portland, 1963-1968.

	1963	1964	1965	1966	1967	1968
Total revenue (000)	2,233	2,044	1,833	2,495	1,964	2,007
Pounds landed, total (million)	42.5	48.8	45.8	49.3	41.8	44.4
Ocean perch	25.7	26.0	22.4	22.5	19.0	14.7
Whiting	11.0	17.6	18.7	20.4	14.5	20.0
Price						
Ocean perch	4.88¢	4.25¢	4.13¢	4.16¢	4.01¢	4.01
Whiting	1.5¢	1.48¢	1.75¢	3.9¢	2.51¢	2.86
Trips						
O.T.	1,487	1,740	2,406	3,136	3,146	3,282
Gill nets	625	482	409	546	556	713
No. lbs/trips	18,527	20,982	15,289	12,579	10,971	11,030

le 7. Landings at Point Judith, Rhode Island and Rockland, Maine, 1963-1968.

	1963	1964	1965	1966	1967	1968
nt Judith						
ounds (million)	19.79	18.78	14.1	14.3	11.6	13.6
Blackback	2.69	3.82	3.36	3.82	3.2	2.79
Yellowtail	8.45	7.57	5.06	4.93	4.39	4.82
kland						
ounds (million)	39.0	33.5	37.0	42.0	44.1	44.5
Ocean perch	37.2	33.5	37.6	42.8	42.9	43.1

Only scallops have experienced significant price compensation. These decreased landings have been associated with a 20 percent decline in revenues from groundfish. Landings per trip for groundfish have remained stable, but have been associated with declining trips and declining revenues in the past three years. Stocks of flounders and scallops, based on survey data, are expected to decline in coming year.

Portland: Total landings have remained the same, despite an increased number of trips. Landings per trip have decreased about 50 percent while total revenues have remained constant. Revenues have been supplemented by abandoning the traditional species in favor of the new shrimp resources, which explains in part the increased number of trips and declining catch per trip.

Point Judith-Rockland: While blackback landings have remained constant at Point Judith, yellowtail and other landings have decreased. Though more comprehensive data is not readily available, uniform New England prices suggest total revenues declining in Rockland. Though ocean perch landings have increased slightly, declining prices indicate that this is not a promising alternative to other declining resources. The smaller vessels may switch to shrimp.

Having ascertained that the New England area fisheries have resource problems the next step under the incentive plan is to determine if there are underutilized species available in the area that meet the necessary criteria to become economically self-sustaining. Fortunately, Bureau of Commercial Fisheries installations in New England have as part of their work in the past made censuses of the standing stocks and sustainable yields of the species that are available to New England vessels.[1/] These are shown in tables 8 and 9. They have also provided information as to schooling habits, seasons available and gear needed. The Technological Laboratory in Gloucester has provided information on taste, color, and texture for some of the species. This provided us with most of the necessary information that is needed to make suggestions as to which species might be initially considered for a pilot program shown in table 10.

A brief discussion of some of these is included in Appendix I. This list is preliminary and should be revised as new information becomes available. Some of the species which are very good food fish have been excluded because they are thought to have small standing

---

1/ Biological Laboratory, Bureau of Commercial Fisheries, P. O. Box 6, Woods Hole, Massachusetts 02543
Technological Laboratory, Bureau of Commercial Fisheries, Emerson Avenue, Gloucester, Massachusetts 01930.

Table 8. Estimated standing crops in New England waters and average annual landings for the period 1963-1965. To nearest million pounds.[2/]

	Standing Crop	Average Annual Landings	Percentage of Standing Crop Landed
Silver hake (whiting)	2,084	638	30.6
Sea herring	1,824	529	29.0
Spiny dogfish	1,373		
Haddock	980[2/]	337	34.4
Red hake	694	176	25.4
Pollock	596	54	9.1
Thorny skate	579		
Cod	489	156	31.9
Ocean perch	399	54	13.5
Little skate	386		
Butterfish	309	10	3.2
Big skate	295		
Argentine	187	9	4.8
Blackback	185	32	17.3
Yellowtail	185	93	50.3
Barndoor skate	178		
Eel pout	171	12	7.0
White hake	72	7	9.7
American plaice (Dab)	125	9	7.2
Scup	66	10	15.2
Greysole	32	4	12.5
Alewife	87	42	48.3

1/ Abstracted from Robert L. Edwards, "Fishery Resources of the North Atlantic Area," The Future of the Fishing Industry of the United States, University of Washington, March 24-27, 1968, Vol. 4, Table 9, p. 59.

2/ As shown in table 1, the abundance of haddock has recently declined drastically from this 3-year average.

Table 9. Estimated sustained production capabilities in New England waters for various latent or largely unused fishery resources, in millions of pounds (Courtesy Keith A. Smith).[1]

	Estimated Production Potential by Areas		
	ICNAF Subarea 5	Middle Atlantic	Total Estimated Annual Yield
FISHES			
Anchovies	6.6	15.0	21.6
Bluefin tuna	15.0	4.4	19.4
Yellowfin tuna	-	11.0	11.0
Skipjack	55.0	22.0	77.0
Little tuna & others	2.2	2.2	4.4
Swordfish	4.4	2.2	6.6
Sharks	77.0	66.0	143.0
INVERTEBRATES			
Ocean quahogs	11.0	114.0	125.0
Northern shrimp	55.0	-	55.0
Red crabs & others	2.2	2.2	4.4
Surf clams	5.0	85.0	90.0

1/ Ibid, p. 60

stocks. Subsequent discoveries of much larger standing stocks, as the areas ranged by the fishermen become wider, would necessitate program revisions if some of the initial choices prove unsuccessful.

In table 10 we have shown the latest figures available for New England landings of these suggested species, and the increases in landings programmed based upon present estimates of (1) projected idle harvesting capacity, (2) the magnitude of the resources and (3) the response to the proposed price incentive.

As can be seen in table 11 the suggested species require gear changes from that presently used by New England trawlers. The needed changes can be expedited by Bureau of Commercial Fisheries personnel working with the fishermen to show them how to handle the new gear most efficiently and by making loans so that they could buy the gear. The fishermen also have to be shown how to handle the fish properly so that they can bring them to port in the best condition. On shore, new processing equipment has to be installed to handle species which are different than those that have been landed in the past. This will be especially true of shrimp and ocean quahogs. Since efficiency in making the transition to the new species requires that the processing facilities be available when they are landed, the Bureau of Commercial Fisheries should help processors with technical advice and loans for new equipment where necessary.

Table 10. Those underutilized species of New England waters with immediate market potential and estimated possible increases in landings (millions).

	Standing Crop	N. E. Landings 1966	Potential Increases in Landings 1/
Silver hake (whiting)	2,084	84	25
Pollock	596	9	21
Shrimp	2/	4	25
Ocean quahogs	2/	-	25
Mackerel	100	8	7
Total		105.5	98

1/ The potential increase in landings was determined by estimating: 1) the projected idle harvesting capacity, 2) the magnitude of the resource, and 3) the response to the price incentive.

2/ Estimates of the standing crop are not available, but estimated annual yield is 55 million pounds of heads on shrimp and 125 million pounds of ocean quahog meat.

Table 11. Proposed Species and Suggested New Gear

Species	Technique	Gear
Silver hake	Bottom	Convert to Russian 27-1 herring trawl[1/]
Pollock	Mid-water	Convert to universal or mid-water trawl[2/]
Shrimp	Shrimp trawl	Convert to shrimp trawl
Ocean quahog	Dredge	Convert to dredge
Mackerel	Seine	Convert to seining

1/ "During our joint US - USSR research at Woods Hole in the fall of 1967, we compared the catch rates of various species using the Yankee Trawl and the Soviet 27.1 Herring Trawl. Both trawls have a spread on the bottom of 35 to 40 feet. Two quite different experiments were carried out with comparable results, and some of the results were startling." The 27.1 Herring Trawl was shown to be 3.6 times more efficient than presently used gear for this species.
Robert L. Edwards, "Fishery Resources of the North Atlantic Area," The Future of the Fishing Industry of the United States, University of Washington, March 24-27, 1968, Vol. 4, p. 57.

2/ Ibid.

The new species may require different methods of preparation from those that consumers normally use. The Bureau of Commercial Fisheries home economists should have suitable recipes for them ready so that as the new species become available in the supermarkets the consumers will be induced to experiment.

Expenditures may also be incurred in different aspects of marketing due to the problems associated with the introduction of these new species into wholesale and retail channels.

Costs of the Pilot Program

Based on our preliminary calculations table 12 presents suggested price incentive levels and total costs for the species which will be harvested under this program during fiscal year 1970. The summation of these costs therefore represents the total program costs for the price support element of this program.

For each of these species the average price range for 1965-68 is presented. Based on this price, and the present and increased quantities in table 10, an incentive price was derived. In each case this price is designed to be just sufficient to elicit the production stipulated.[1/]

The net first year cost thus becomes the difference between the incentive price and the market price for each species times the quantity harvested. It is assumed that in each case the increased quantity will drive the market price to or below the average of the 1965-68

1/ For the purpose of this presentation these prices are first approximations. More precise calculations will be prepared subsequently.

Table 12. Incentive price, Government cost per species, and total incentive cost for a New England price incentive program. Fiscal year, 1970.

Species with incentive price	(1) Market price range 1965-1968 (lb.)	(2) New England 1966 landings (millions)	(3) Expected incentive plan landings (millions)	(4) Incentive price 1/	(5) Market clearing price	(6) Net government cost/lb 2/	(3) x (6) Total first year cost (000)
Silver hake	3-4.5	84	109	5	3	2	2,180
Northern shrimp	8-12	4	25	22 3/	18	4	1,000
Ocean quahogs	-	0	25	9	7	2	500
Pollock	6-8	9	30	9	6	3	900
Mackerel	6-8	8	20	9	7	2	400
TOTAL	-	105	209	-	-	-	4,980

1/ When used for food fish only and of high quality.
2/ In some cases this net cost/lb is a partial result of increased supplies lowering market price.
3/ When cooked on board (or the day caught) and properly refrigerated.

price range. For simplification all price and quantity effects are registered immediately and at the same magnitude for the full year.

This plan is proposed for three years (see table 13). A measure of the plans success will be the establishment of stable, self-supporting markets at higher volume levels for these species. As this occurs the net Government cost per pound should decrease, going to zero in many cases. To the degree the species develops a self-sustaining market funds will be released to include an additional fishery in this program, this addition to come from those species discussed in Appendix I.

The bulk of the market development activity for this program would take place in the first year. Costs would decrease considerably thereafter. This would also be true with respect to costs associated with any necessary initial assistance for gear conversion and the development of processing capacity. With this in mind the cost of the price incentive element of this proposed program is funded at full cost for the first year ($4,980,000), two-thirds this level for the second year ($3,320,000) and one-half this level for the final year ($1,660,000).

Table 13. Program Costs, Existing Programs and Funding Needs, F.Y. 1970, 71, 72 (000)

	1970	1971	1972	Total
Price incentive	4,980	3,320	1,660	9,960
Marketing Assistance	500	333	167	1,000
Gear Assistance	100	067	033	200
Direct	200	133	67	400
Loans	500	100		600
Loans to Processors	1,000	250		1,250
Transportation development and research*	150	100	50	300
Administration*	200	133	67	400
Total	7,530	4,369	2,011	13,910
Less loans repaid	-	-	-	12,060 7/

Present funds in related uses (F.Y. 1969)	
BCF Marketing	860
Resource Disaster	50 1/
Exploratory fishing	3,100
Marketing and technology	70
P.L. 88-309,304	
Connecticut	45
Maine	330 (55) 3/
Massachusetts	305 (54) 3/
New Hampshire	139 (100) 4/
Rhode Island	157

Existing and new funding, annual average for 1970, 71, 72	
Existing programs 5/	
Region 3	50
P.L. 88-309-4(b), 4(c)	
Appropriated	50
Authorized	700 6/
Exploratory Fishing	100
Marketing Technology	25
P.L. 88-309-Sec.3	
Massachusetts	50
Maine	50
Rhode Island	50
New Hampshire	25
Connecticut	10
Total existing programs	410
New authorization & approp.	3,520
New appropriation	700 6/
Total additional cost	4,637 7/

*Contained herein would be $200,000 for the Division of Economics to conduct research on optimum marketing and transportation systems and the optimum support levels and associated supply and demand responses.

1/ This is the amount currently appropriated. The Bill authorizes $750,000 in Sections 4(b) and 4(c) for Disaster Assistance and developing new fisheries.

2/ These represent current average annual expenditures in each of these States.

3/ These are portions of the overall State total which are devoted specifically to marketing activities.

4/ These funds are to be used to assist in developing a commercial fishery.

5/ This is money in existing programs requiring only slight modification to be coordinated with this program.

6/ This is the amount in 88-309, 4(b), 4(c), which is authorized, but has not been appropriated.

7/ Actual cost of these loans, when repaid, is zero, although funds must be made available in the first two years of this program.

The cost of marketing assistance is estimated to be $500,000 in the first year and falling to $333,000 in the second year and $167,000 in the third year for a total three-year program of $1,000,000.

Gear assistance to the fishermen is broken into three categories: (1) new research, (2) direct assistance for training the fishermen and (3) loans for gear acquisition. The first is programmed for a total cost of $200,000, the second $400,000, and the last for $600,000.

Loans to processors are programmed for $1,000,000 in the first year and $250,000 in the second. the expectation being that the majority of the conversions will occur within the first year.

Other costs of $300,000 would be incurred for transportation development and research. The bulk of these costs would be for a continual reassessment of the effectiveness of the program, developing theoretical and practical tools for making such changes as are necessary in the seasonal patterns of support prices and the array of species to be included in the program.

Administration costs are estimated to be $400,000 over the three-year life of the program.

Benefits of the Pilot Program

A prefatory evaluation of the initial regional affects of this program yield the following statistics. The net dollar ex-vessel value of the additional landings would be $16,000,000, with an ultimate retail value of $40,000,000. Associated with this activity would be some 400 assorted vessels with a labor force of approximately 1600 men at the harvesting level. Total labor employed to the retail level would be 4200. Total first-year revenues generated by this program exceed total three-year costs by a factor of 2.8:1. The comparison between all accumulated revenues over time and these costs would obviously be much greater.

Additional benefits not mentioned above would include improved earnings to those remaining in the traditional fisheries. Also, the American consumer would now be able to choose between a broadened selection of high quality food products which would be available throughout the year.

APPENDIX I

Species Considered for this Proposal

Those Chosen

Silver hake (whiting): This is an excellent food fish if properly handled and merits consideration on this ground because of its great abundance. Part of the problem with marketing in the past has been caused by poor handling on the boats and by the processors. This is now a seasonal fishery but could become year-round if prices were high enough.

Pollock: This is a good food fish that suffers only by comparison with haddock in flavor and color. It is available in large quantities especially in the fall if midwater gear is used.

Shrimp: The northern shrimp is small but quite superior in flavor to Gulf shrimp if properly handled. There should be no problem in selling this product in large quantities at good prices if the harvesting-processing chain is developed properly. This would be a year-round fishery.

Ocean quahog: The demand for clams is insatiable and has put heavy pressure on exploited resources. The ocean quahog is a good substitute and is available in large quantities from the middle Atlantic to Maine. Conversion to dredging is feasible with financial assistance in the form of loans.

Mackerel: Once the basis of a large fishery the resource disappeared for many years but now has returned in great abundance. In the meantime a new generation has grown up that doesn't appreciate it and fishermen have forgotten how to fish for it.

Species not Chosen

Cod: Cod have always been landed incidentally to haddock but it is slightly inferior in flavor, and less abundant than haddock. In modern times there has not been an exclusive cod fishery. With very high haddock prices it should become established in the markets with no incentives necessary. The resource would not sustain additional harvesting pressure beyond this level.

Ocean perch (redfish): Although a good food fish and once the basis of a large fishery ocean perch have parasite problems that have contracted it. If the parasite problem could be solved it could be the basis of a large fishery once again.

Species that Might be Used.

Skates, Dogfish: Both these species are widely utilized in Europe but are considered trash fish and worse here. There may be a considerable export market for both of these or an institutional market.

Sea herring: Although extremely abundant and a good table fish it was not felt that this fish could be marketed in large quantities at the present time.

Butterfish: This is reputed to be an excellent pan fish and was once taken in larger quantities. It would be an excellent candidate for the program if sufficient quantities of 1/2 - 3/4 pound fish could be found. These presently exist only in mid-Atlantic.

White hake: A good table fish, it commands a good price when landed. The resource is apparently underutilized because it is only taken incidentally to haddock fishing. Further information is needed on the nature of the resource before it can be evaluated as a candidate for this program.

(continued from inside front cover)

14. A Price Incentive Plan for Distressed Fisheries by A. A. Sokoloski and E. W. Carlson.

15. Demand and Prices for Shrimp by D. Cleary.

16. Industry Analysis of Gulf Area Frozen Processed Shrimp and an Estimation of Its Economic Adaptability to Radiation Processing by D. Nash and M. Miller.

17. An Economic Evaluation of Columbia River Anadromous Fish Programs by J. A. Richards.

18. Economic Projections of the World Demand and Supply of Tuna, 1970 - 90 by F. Bell.

19. Economic Feasibility of a Seafood Processing Operation in the Inner City of Milwaukee by D. Cleary.

20. The 1969 Fishing Fleet Improvement Act: Some Advantages of its Passage by the Division of Economic Research.

21. An Economic Analysis of Policy Alternatives for Managing the Georges Bank Haddock Fishery by L. W. Van Meir.

22. Some Analyses of Fish Prices by F. Waugh and V. Norton.

23. Some Economic Characteristics of Pond-Raised Catfish Enterprises by J. E. Greenfield

24. Elements Crucial to the Future of Alaska Commercial Fisheries by D. Nash, A. Sokoloski, and D. Cleary.

25. Effects on the Shrimp Processing Industry of Meeting the Requirements of Wholesome Fishery Products Legislation by D. Nash and M. Miller.

26. Benefit Cost Analysis of a Proposed Trawl Systems Program by M. Miller.

27. An Economic Analysis of Future Problems in Developing the World Tuna Resource: Recommendations for the Future Direction of the BCF Tuna Program by F. Bell.

28. Economic Efficiency in Common Property Natural Resource Use: A Case Study of the Ocean Fishery by D. W. Bromley

29. Costs, Earnings and Borrowing Capacity for Selected U. S. Fisheries, by A. Sokoloski, E. Carlson, and B. Noetzel. CONFIDENTIAL

30. Fish Cycles: A harmonic analysis by F. Waugh and M. Miller.

31. Benefit-Cost Analysis as Applied to Commercial Fisheries Programs, by F. Bell.

32. Economic Study of San Pedro Wetfish Boats by W. F. Perrin and B. Noetzel.

The goal of the Division of Economic Research is to engage in economic studies which will provide industry and government with costs, production and earnings analyses; furnish projections and forecasts of food fish and industrial fish needs for the U. S.; develop an overall plan to develop each U. S. fishery to its maximum economic potential and serve as an advisory service in evaluating alternative programs within the Bureau of Commercial Fisheries.

In the process of working towards these goals an array of written materials has been generated representing items ranging from interim discussion papers to contract reports. These items are available to interested professionals in limited quantities of offset reproduction. These "Working Papers" are not to be construed as official BCF publications and the analytical techniques used and conclusions reached in no way represent a final policy determination endorsed by the U. S. Bureau of Commercial Fisheries.